

# FILLED CAVITIES SEMICONDUCTOR DEVICES

## Abstract

In an embodiment of the invention, a dielectric material comprises a matrix of a material selected from the group consisting essentially of organic materials, inorganic materials and organo-silicate materials; a plurality of pores dispersed throughout the matrix; and a gas filling the pores. The gas is selected from the group consisting essentially of inert gases, depositing gases, and breakdown suppressing gases. The filled pore dielectric material is suitably used in a damascene wiring layer. In further embodiments, a plasma device comprises an integrated circuit (IC) chip substrate; at least one dielectric layer having a thickness on a surface of the substrate, a cavity formed in the dielectric layer, at least two electrodes disposed in the cavity; and a plasma gas filling the cavity. The plasma device can operate as a light source or as a switch.